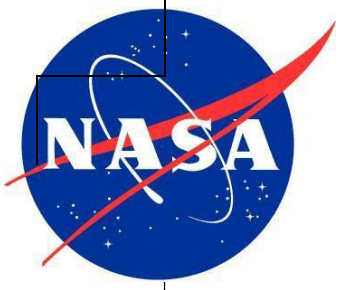
BALLOON PROGRAM OFFICE (BPO)

FY20 ANTARCTICA CAMPAIGN MISHAP PREPAREDNESS AND CONTINGENCY PLAN (MPCP) ANNEX

Effective Date:
November 2019

Expiration Date:
February 2020

820/NASA Balloon Program Office



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CHANGE HISTORY LOG

REVISION	EFFECTIVE DATE	DESCRIPTION OF CHANGES
-	7/19/19	Complete revision of the BPO MPCP, including annex templates for each campaign location and attachments. This cancels 820-2016-PLAN-02 revision A and all previous versions.

Appending Annex change will not require a revision of this MPCP

REVISION	EFFECTIVE DATE	DESCRIPTION OF CHANGES
-	11/1/19	Initial release

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1 PLAN SCOPE

The Balloon Program Office (BPO) conducts operations at the launch site and remotely through mission support and recovery operations. As such, a BPO mishap or close-call can occur at the launch site or offsite along the path of the balloon trajectory and impact recovery site. Regardless of the geographic location or host site, National Aeronautics and Space Administration (NASA) will conduct an investigation of NASA BPO incidents. This document will, for each mission, describe the science mission, assign a mission value, and describe what constitutes mission failure. The authority document for this campaign specific Mishap Preparedness and Contingency Plan (MPCP) annex is the BPO MPCP, 820-MPCP-2019-01; therefore, all requirements put forth in this plan are applicable.

1.1 Authority Document

Document Number	Title
820-MPCP-2019-01	Balloon Program Office (BPO) Mishap Preparedness and Contingency Plan (MPCP)

1.2 Applicable Documents and Memorandum Of Agreement (MOA)

In addition to the applicable documents and MOA defined in 820-MPCP-2019-01, the following are also applicable:

Document Number	Title
803-GS-GSP-BPO-ANTARCTICA-2019-01	Ground Safety Plan (GSP) for Balloon Program Office 2019 Antarctica Campaign
803-FS-FSP-BPO-ANT2018/19-01A	Flight Safety Plan (FSP) for Balloon Program Office 2019 Antarctica Campaign
803-FS-RAR-BPO-ANT2018_19-01A	Balloon Risk Analysis Report (RAR) for Antarctica Conventional Balloon Missions 2019 Campaign
820-LMPP-1904 820-LMPP-1905 820-LMPP-1906 820-LMPP-1907	Mission Portfolio Project Plan Annexes – SuperTIGER, BLAST, TRAVALB-01, TRAVALB-02 respectively.
820-PLAN-BIMP-2019-1	FY2020 Balloon Implementation and Management Plan (BMIP) for Antarctica Long Duration Balloon Flights

1.3 Reference Documents

In addition to the reference documents defined in 820-MPCP-2019-01, the following are also applicable:

Document Number	Title
800-WI-8715.2	Severe Weather Notification

1.4 Campaign Description

Launches are conducted from Long Duration Balloon (LDB) launch pad, located about eight miles from McMurdo Station on the Ross Ice Shelf. Since 1996, the launch site has been operated exclusively as a field camp to support scientific balloon operations. Launch site position is on or about 77.86° south latitude and 167.13° east longitude near sea level. A single circumpolar flight trajectory is nominally 9 to 14 days, traveling to the west, and typically bounded between 73° to 82° south latitude for balloon float altitudes of 105,000 to 130,000 ft.; flights requiring multiple circumnavigations are to be identified and agreed to prior to implementation of the Antarctica launch campaign. For mission planning purposes, logistics requirements are quite stringent; therefore, experiment, payload, and ground support equipment (GSE) must be flight ready prior to departure from the United States (U.S.). Logistics, housing, meals, and other on-site support are provided by the National Science Foundation (NSF) who has responsibility for management of U.S.-sponsored polar programs in Antarctica.

Large scientific balloons launched near McMurdo Station, Antarctica, provide high altitude and long-duration flights that are required for scientific payloads in several fields. Occasionally, small hand launched balloons from McMurdo or elsewhere with payloads less than about 50 kg also provide unique research opportunities.

Launch operations are normally conducted from about December 1 through January 10 each year, based upon establishment of summer season stratospheric anti-cyclone winds. Launch is contingent upon establishment of the anti-cyclone winds. Flights may remain aloft as late as January 21 but recovery assets become scarcer near the end of the season. Columbia Scientific Balloon Facility (CSBF) support personnel normally begin arriving at McMurdo Station around November 1 each year. Science personnel may arrive earlier, if required to ensure their flight readiness date. This scheduling will be coordinated by the CSBF Campaign Manager (CM). Typical departure dates from Antarctica run no later than around January 20 to 30 to ensure complete departure of equipment and personnel before the NSF's "winter-over" operations begin. If a mission is unable to be launched due to extenuating circumstances, the mission may be wintered-over for the next campaign.

Shipping of all CSBF equipment in support of each year's campaign is no later than the end of August to allow time for equipment to arrive at Port Hueneme, California for on-forward ocean shipment to New Zealand and then to McMurdo by air. This includes experiments, ground station equipment, flight equipment, and all final shipments required for flight support the following November. CSBF ships heavy items such as balloons and helium to McMurdo one year in advance, so special balloon configuration requirements must be identified early enough to be built and shipped. This typically means that special balloon requirements must be identified and approved no later than May 1 for operations which require them to be used two summer seasons hence to allow sufficient time for special engineering considerations, construction, and shipment to Port Hueneme, California prior to on-forwarding to Antarctica.

Because shipment of equipment is due out by the end of August, pre-deployment integration in Palestine must be concluded by the middle of August each year. Following this integration and compatibility testing, a Mission Readiness Review (MRR) is conducted prior to shipment to assess the readiness of both the experimenter and the CSBF. It should be understood that all equipment is shipped directly from the CSBF to Port Hueneme following pre-deployment integration. No configuration changes to the science experiment (including flight software) or the CSBF support systems are allowed following integration without approval from the MRR technical panel.

Balloon mishaps or close-calls occurring at NASA LDB Facilities located near the U.S. McMurdo Research Station, even while under the auspices of the NSF, are by definition, a "NASA Mishap", regardless of the ownership of the property involved, therefore, NASA will have primacy of investigation. University Principle Investigators (PI), and their teams, are expected to cooperate with BPO and CSBF in response to a mishap or close-call.

Similarly, any mishaps and close-calls involving injury to NASA personnel are by definition a "NASA Mishap" regardless of location. In the event of a potential or confirmed NASA Balloon mishap or close-call occurring at the NASA LDB launch site, the BPO is expected to execute mishap response and investigation in accordance with NPR 8621.1.

The National Science Foundation (NSF) may elect to conduct a parallel investigation. NASA will coordinate with NSF on the mishap to determine if NSF wishes to exercise its own investigation.

This campaign is comprised of two hand launches and two zero pressure missions. There are three primary missions and five piggyback (pb) missions. The following are the missions associated with this campaign.

Mission	Principal Investigator (PI)	Organization (Org.)	Balloon
Super Trans-lron Galactic Element Recorder (SuperTIGER)	Brian Rauch	Washington University in St. Louis (WUSTL)	W39.57 ZP
Polar Mesospheric Clouds (PMC Turbo) (pb)	Dave Fritts	GATS Inc.	N/A
Exposing Microorganisms in the Stratosphere (E-MIST) (pb)	David J. Smith	NASA Ames Research Center	N/A
Balloon Air Sampler (BAS) (pb)	Alex Meshik	WUSTL	N/A
Advanced Particle-astrophysics telescope Lite (APTLITE) (pb)	James Buckley	WUSTL	N/A
Balloon-borne Large Aperture Submillimeter Telescope (BLAST)	Mark Devlin	University of Pennsylvania (UPENN)	34.43H ZP
Trajectory Validation for (Galactic/Extragalactic Untra Long Duration Balloon (ULDB) Spectroscope Terahertz Observatory) GUSTO (TRAVALB)	Robert Salter	NASA CSBF	0.6 SPB
Balloon Array for RBSP Relativistic Electron Losses (BARREL) (pb)	Robyn Millan	Dartmouth University	N/A

Science hazardous materials and processes are documented in the associated NASA GSP.

1.5 Special Procedures

1.5.1 Hazardous Materials and Operations

Defined process is in 820-MPCP-2019-01, section 1.8.4.1. Campaign specific hazardous materials and operations are detailed in the FY20 Antarctica GSP, 803-GS-GSP-BPO-Antarctica-2019-01, and the Risk Analysis Report (RAR) for Balloon Launch Vehicles, 803-GS-RAR-BPO-BALLOONS-01H.

1.5.2 Unexploded Ordnance and Hazardous System Disposal

Defined process is in 820-MPCP-2019-01, section 1.8.4.2. Campaign specific instructions are detailed in the FY20 Antarctica Ground Safety Plan, 803-GS-GSP-BPO-ANTARCTICA-2019-01.

1.5.2.1 Active Aborted Launch

Defined process is in 820-MPCP-2019-01, section 1.8.4.2.a. Campaign specific roles and responsibilities for flight termination and flight termination criteria are detailed in the FY20 Antarctica Flight Safety Plan (FSP), 803-FS-FSP-BPO- ANT2018/19-01A.

1.5.2.2 Nominal Termination or Controlled Abort

Defined process is in 820-MPCP-2019-01, section 1.8.4.2.b. Campaign specific roles and responsibilities for flight termination and flight termination criteria are detailed in the FY20 Antarctica FSP, 803-FS-FSP-BPO- ANT2018/19-01A.

1.5.2.3 Off-Nominal Termination

Defined process is in 820-MPCP-2019-01, section 1.8.4.2.c. Campaign specific roles and responsibilities for flight termination and flight termination criteria are detailed in the FY20 Antarctica FSP, 803-FS-FSP-BPO- ANT2018/19-01A.

1.6 Coordination with Local Authorities

In accordance with 820-MPCP-2019-01. For mishaps or close-calls that occur at the LDB - Antarctica, NASA will have primacy of investigation unless directed otherwise. NSF or other organizations may elect to conduct a parallel investigation. NASA will coordinate with other agencies on the mishap to determine if they wish to exercise their own investigation as required. Debris will be re-located under the direction of the Investigating Authority (IA), if required. For mishaps or close-calls occurring offsite NASA will coordinate with respective authorities and will conduct an investigation irrespective of primacy. In accordance with NPR 8621.1, NASA may only impound NASA equipment unless prior arrangements are in place. Offsite debris shall be documented in accordance with Interim Response Team (IRT).

2 OVERVIEW OF RESPONSIBILITIES

The steps for responding to a balloon campaign mishap or close-call, including the response, notification, record keeping, and IRT activities are summarized in the BPO Mishap Preparedness and Contingency Plan, 820-MPCP-2019-01.

In addition to the defined roles and responsibilities in 820-MPCP-2019-01, the following are applicable to the campaign.

2.1 The Principal Investigators (PI) and their team members shall:

a. Provide support to the IRT, as required.
b. Provide support to Accepted risk investigations, as required.

2.2 The Mission Manager (MM) shall:

a. For each IRT event, document who is on-station. If possible, also document who is observing the balloon activities. This information should come from the CSBF and PIs. This list may be invaluable for the IRT as a start of a witness list.

3 TRAINING REQUIREMENTS

3.1 IRT Training

Training is defined in 820-MPCP-2019-01, section 3.1.

3.2 BPO MM IRT Lead Training

Training is defined in 820-MPCP-2019-01, section 3.2.

3.3 IA Training

Training is defined in 820-MPCP-2019-01, section 3.3.

3.4 MPCP Practice Exercise

As defined in 820-MPCP-2019-01, IRT members shall participate in all onsite training exercises and simulations.

As defined in 820-MPCP-2019-01, the emergency response team and IRT shall conduct an internal tabletop as well as support the balloon campaign nominal and off-nominal exercises for additional awareness of the mission and this plan.

4 MISHAP MANAGEMENT

4.1 Definitions

4.1.1 Mishaps

An incident categorized as a mishap as defined by NPR 8621.1, shall include but is not limited to occupational injury to NASA personnel; injury to non-NASA personnel and/or damage to public or private property caused by NASA operations; and destruction of NASA property. This category of incident shall be reported and investigated under the authority of NPR 8621.1, GPR 8621.4, 803-GS-PLN-INST-01, and 820-MPCP-2019-01.

4.1.2 Close-calls

An event in which there is no injury or only minor injury requiring first aid and/or no equipment/property damage or minor equipment/property damage (less than $20,000), but which possesses a potential to cause a mishap. This category of incident shall be reported and investigated under the authority of NPR 8621.1, GPR 8621.4, 803-GS-PLN-INST-01, and 820-MPCP-2019-01.

4.1.3 Mission Failure

As defined in NPR 8621.1, mission failure is mishap of whatever intrinsic severity prevents the achievement of the mission's minimum success criteria or minimum mission objectives as described in the mission operations report or equivalent document.

Note

A mission failure applies only to a NASA program's mission, and not to a test or ongoing institutional operation. A program that accomplishes all minimum success criteria, but not full mission objectives, is not a mission failure, although in some cases, it may appropriately be classified and investigated as a close-call.

It is important to note that in agreement with program stakeholders and in accordance with baseline programmatic implementation, the BPO has defined test flights or certain incidents as “accepted risks” and therefore will not be considered mission failures. The following are accepted by BPO and the appropriate organizations and are not considered a mishap or close-call:

- The risk associated with not meeting minimum success or retrieving data obtained due to operational constraints;
- A balloon or payload failure or malfunction, or;
- Accepted risks as denoted in the Portfolio Project Plan Annex (LMPP).

4.1.4 Accepted Risks

In accordance with baseline programmatic implementation and in agreement with program stakeholders, incidents considered accepted risks shall include but are not limited to:

- Launch abort;
- Failure to meet mission or science minimum success requirements;
- Failure of the balloon during the launch, ascent, or float phases;
- Failure of support equipment or instrumentation;
- Failure of science equipment or instrumentation;
- Recoverable damage to support or science equipment prior to or during the launch process;
- Unrecoverable damage or loss of support or science equipment due to mission operations, including flight termination and landing, environmental, provided no safety constraints were violated.

Mission specific variances in accepted risks shall be formally documented and agreed upon by the BPO Chief and PI or other stakeholders, as needed. It is the prerogative of the BPO Chief in consultation with Suborbital and Special Orbital Projects Directorate (SSOPD) management and Wallops Flight Facility (WFF) Safety Office to determine whether an accepted risk should be elevated to a close-call or mishap.

4.2 Science Missions in the Campaign

4.2.1 Classification of Mishap for each Mission in the Campaign

The following describes each science mission, their objectives, estimated values (cost/price), and defines minimum mission success criteria.

4.2.1.1 Super Trans-Iron Galactic Element Recorder (Super-TIGER)

Mission Description: This experiment is an upgrade and re-flight of the SuperTIGER instrument flown from Antarctica in 2012-2013. It uses plastic scintillator dE/dx detectors and Cherenkov counters with differing refractive indices. For trajectory, it uses a scintillating fiber hodoscope. There are four payloads of opportunity: E-MIST, PMC TURBO, BAS, and APTLITE.

Mission Estimated Value: $1.84M

Project Plan Annex: 820-LMPP-1916 defines the accepted risks of the mission and the success criteria.

Minimum Mission Success Definition: Mission success will be declared based on minimum or comprehensive success criteria. To declare minimum success, the flight must reach an altitude of 115 kft. for a duration of 8 days. For comprehensive success criteria to be met, the flight must reach an altitude of 128 kft. for a duration of 60 days. The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.2 Polar Mesospheric Cloud Turbulence Experiment (PMC Turbo)

Mission Description: The PMC Turbo experiment will perform a LDB flight over Antarctica in order to observe very fine dynamical structures revealed in the PMC layer at ~82 km (269 kft.) in austral summer 2019-2020. Analyses of these image sequences, and associated high-resolution modeling of these same dynamics, are expected to revolutionize our ability to view and understand the details of geophysical turbulence sources and morphologies for a wide range of source and environmental conditions.

Mission Estimated Value: $20K
Project Plan Annex: N/A

Minimum Mission Success Definition: 35 km (114.8 kft.), for 10 days with an altitude stability of 3 km, (9843 ft.). The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.3 Balloon-borne Large Aperture Submillimeter Telescope (BLAST)

Mission Description: BLAST will perform submillimeter observations of star forming regions in the Milky Way.

Mission Estimated Value: $5M

Project Plan Annex: 820-LMPP-1917 defines the accepted risks of the mission and the success criteria.

Minimum Mission Success Definition: 120 kft. for 14 days, with an altitude statiblity of +/- 1,000 ft. The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.4 Exposing Microorganisms in the Stratosphere (E-MIST)

Mission Description: Evaluates the survival and response of microbial species to Mars-like conditions in the stratosphere. The data will be assayed to determine percent survival, which genes are activated or suppressed due to stress, and the extent of genetic mutations.

Mission Estimated Value: $15K

Project Plan Annex: N/A

Minimum Mission Success Definition: 20 km float altitude for 4 hours. The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.5 Balloon Air Sampling (BAS)

Mission Description: Samples air at three different altitudes for precise isotopic analyses, to study variations of elemental and isotopic compositions of noble gases over the South Polar Region.

Mission Estimated Value: $30K

Project Plan Annex: N/A

Minimum Mission Success Definition: Attain an altitude of 100 kft. No float duration requirement. The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.6 Advanced Particle-astrophysics telescope Lite (APTLITE)

Mission Description: Technology demonstration for the APTLITE mission, demonstrating equipment for charge resolution of Iron-group cosmic rays. This includes technical readiness of Silicon Photomultiplier (SiPM) photodetectors, bias-voltage control, and analog-pipeline readout ASICs for balloon or space deployment.

Mission Estimated Value: $30K

Project Plan Annex: N/A

Minimum Mission Success Definition: 115 kft. altitude for 8 days. The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.7 Trajectory Validation for GUSTO (TRAVALB)-01 and -02

Mission Description: Mimics the Super Pressure Balloon (SPB) 18 MCF proposed GUSTO mission for SPB altitude, with trajectory validation of 100+ day flight.

Mission Estimated Value: All systems are considered expendable.

Project Plan Annex: 820-LMPP-1918 and 820-LMPP-1919 define the accepted risks of the mission and the success criteria.

Minimum Mission Success Definition: The final minimum success criteria will be defined in the final flight requirements document.

4.2.1.8 Balloon Array for Radiation belt Relativistic electron Losses (BARREL)

Mission Description: Studies electron loss from the Van Allen radiation belts by observing x-rays produced as precipitating electrons enter the atmosphere and the wave-particle interactions causing electron loss. Studies effects of theoretical high-latitude scattering.

Mission Estimated Value: All systems are considered expendable.

Project Plan Annex: N/A

Minimum Mission Success Definition: The final minimum success criteria will be defined in the final flight requirements document.

4.3 Emergency Response

In the event of a mishap requiring emergency services, the following teams shall be activated:

4.3.1 Onsite Incidents

Defined process is in 820-MPCP-2019-01, section 4.3.1. Appendix A includes useful information about emergency response in the Antarctica and may be used by the CM or Mishap Scene Security Coordinator. The CM will coordinate with the local emergency responders.

4.3.2 Offsite Incidents

Defined process is in 820-MPCP-2019-01, section 4.3.2. Appendix A includes useful information about emergency response in the Antarctica and may be used by the CM or Mishap Scene Security Coordinator. The CM will coordinate with the local emergency responders.

4.4 Interim Response Team

In accordance with 820-MPCP-2019-01, section 4.4.

4.4.1 Securing the Mishap Site

In accordance with 820-MPCP-2019-01, section 4.4.1.

4.4.2 Witness Statement Process

In accordance with 820-MPCP-2019-01, section 4.4.2.

4.4.3 Drug Testing

In accordance with 820-MPCP-2019-01, section 4.4.3.

4.4.4 Evidence Preservation, Collection, Chain of Custody, and Impoundment

In accordance with 820-MPCP-2019-01, section 4.4.4.

4.4.4.1 Evidence Preservation

In accordance with 820-MPCP-2019-01, section 4.4.4.1.

4.4.4.2 Evidence Collection

In accordance with 820-MPCP-2019-01, section 4.4.4.2.

4.4.4.3 Evidence Impoundment and Storage

In accordance with 820-MPCP-2019-01, section 4.4.4.3.

Debris storage shall be in documented in the Mission Manager's (MM) Mission Flight Readiness Review (FRR) Checklist and the MM's Day of Launch Procedure. It may be the weld shop in old hanger or a sea container.

Equipment storage shall be in documented in the MM's Mission FRR Checklist and the MM's Day of Launch Procedure. It may be the weld shop in old hanger or a sea container.

Impound storage location for data (*e.g.*, photographs, videos, and scanned records) shall be documented in the MM's Mission FRR Checklist and the MM's Day of Launch Procedure. A controlled meta-site will be developed.

4.4.4.4 Evidence Chain-of-Custody

In accordance with 820-MPCP-2019-01, section 4.4.4.4.

4.5 Turning Investigation over to Investigating Authority (IA)

In accordance with 820-MPCP-2019-01, section 4.5.

APPENDIX A
EMERGENCY RESPONSE INFORMATION

Range	**McMurdo, Antarctica**
Medical Emergency Process:	Call 911
Medical Equipment and Supplies:	First-Aid Kits
Automated External Defibrillator:	Onsite
Staff with First Aide Training (Who):	Mission Manager has a list of trained personnel
Ambulance:	1 at fire station 1 at airport
EMTs:	Yes
Total Travel Time to Emergency Room:	Depends on weather and location
Location of Nearest Med-Evac.:	McMurdo
Total Time for Med-Evac.:	Depends on weather and location
On-Range Medical Facility (Beds, Capability):	Very limited
Nearest Hospital (Beds, Capability):	Christchurch, New Zealand (8 hours by plane minimum)
Weather Office Onsite:	Yes
Lightning Procedure:	Reference 800-WI-8715.2.1, *Severe Weather Notification* Lightning Advisory: Electrical storm detected within 25 nautical miles of hazardous work areas and is forecast to be within 10 nautical miles of those work areas in less than 20 minutes. All hazardous operations transition to appropriate stopping point. Lightning Warning: Electrical storm is detected within 10 nautical miles or the potential for an electrical storm is forecasted within 5 nautical miles. All hazardous operations (no matter the state) shall stop and personnel shall clear unprotected hazard areas.
Balloon Impact:	Ground Safety Requirements Antarctic Support Contract (ASC) regulations
Payload Impact:	FSP Ground Safety Requirements ASC regulations
Work Hours Policy:	Duty Time Exception

Weather Environment Considerations:	Ice cap climate Very cold Generally extremely dry weather Temperatures may reach 8°C (46°F) in the austral summer Average wind is 12 knots, but winds have exceeded 100 knots
Local Occupational Safety Requirements:	Occupational Safety and Health Administration (OSHA)
Required Personal Protective Equipment (PPE):	Operationally dependent: Hard Hats Safety Shoes Static Dissipative outer garments, Eyewear Hearing protection High visibility clothing Other PPE as needed

APPENDIX B
CAMPAIGN IRT MEMBERSHIP

Position	Name	Civil Servant or Contractor	Contact Information
IRT Lead	Andy Hynous	Civil Servant	McMurdo, Antarctica
Mishap Scene Security Coordinator	Chris Schwantes	Contractor	McMurdo, Antarctica
Chain-of-Custody Coordinator	Andy Hynous	Civil Servant	McMurdo, Antarctica
Handling and Impound Coordinator	Andy Hynous	Civil Servant	McMurdo, Antarctica
Debris Identification Specialist	Chris Schwantes	Contractor	McMurdo, Antarctica
Photographic Support	Robert Mullenax	Contractor	McMurdo, Antarctica
Written Witness Statement Coordinator	Andy Hynous	Civil Servant	McMurdo, Antarctica
Office of Communications (OC) Advisor	Jeremy Eggers	Civil Servant	(757) 824-2958
Secured Website/IT Support	Michelle Johnson	Contractor	(903) 723-8046

*Note 1: Only NASA Civil Servants (federal employees) may perform the following tasks:
- IRT Lead
- Chain-of-Custody Coordinator
- Handling and Impound Coordinator
- Written Witness Statement Coordinator
- OC Advisor

*Note 2: The IRT Lead may assign additional qualified personnel and/or make task assignment changes, as required.

*Note 3: IRT members shall complete the appropriate training, as listed in 820-MPCP-2019-01 section 3.0.

*Note 4: All IRT personnel shall be trained and equipped with the PPE appropriate for their IRT task assignment.

*Note 5: Photographic Support is provided by NASA MM/Mission Range Safety Officer (MRSO)/Operations Safety Specialist (OSS) and CSBF personnel and collection for impoundment is coordinated by IRT Lead.

*Note 6: Civil Servants include MSRO, NASA OSS, and MM at campaign.

NASA Responsibility Matrix for Mishaps and close-calls Involving the BPO.

	Ground Phase	Flight Phase
Location of Activity	McMurdo, Antarctica	McMurdo, Antarctica
First Responder (Paramedic, Fire, Hazmat)	CSBF or Local	CSBF or Local
Mishap Response Procedures	820-MPCP-2019-01 820-MPCP-Antarctica-2019-01	820-MPCP-2019-01 820-MPCP-Antarctica-2019-01
Notification Contact List	820-MPCP-NOTIFICATION-2019-01	820-MPCP-NOTIFICATION-2019-01

Record Mishap and Close-calls in NASA Mishap Information System (NMIS)	820-MPCP-2019-01	820-MPCP-2019-01
WBS or Charge Code for NASA IRT and NASA IA	Labor: 911542.06.01.12 Procurement: 911542.06.01.13 Travel: 911542.01.02	Labor: 911542.06.01.12 Procurement: 911542.06.01.13 Travel: 911542.01.02
Hazard List	Per CSBF & GSP	Per CSBF & GSP FSP contains risk analysis
IRT Members 820-MPCP-FORM-01	820-MPCP-FORM-01 Appendix A	820-MPCP-FORM-01 Appendix A
Appointing Official	GSFC CD or SSOPD Director or BPO Chief	GSFC CD or SSOPD Director or BPO Chief

APPENDIX C
ACROYNMS

APTLITE	Advanced Particle-astrophysics telescope Lite
BARREL	Balloon Array for RBSP Relativistic Electron Losses
BAS	Balloon Air Sampler
BIMP	Balloon Implementation and Management Plan
BLAST	Balloon-borne Large Aperture Submillimeter Telescope
BPO	Balloon Program Office
CM	Campaign Manager
CSBF	Columbia Scientific Balloon Facility
E-MIST	Exposing Microorganisms in the Stratosphere
FRR	Flight Readiness Review
FSP	Flight Safety Plan
GPR	Goddard Procedural Requirements
GSE	Group Support Equipment
GSP	Ground Safety Plan
GUSTO	Galactic/Extragalactic ULDB Spectroscope Terahertz Observatory
HQ	Headquarters
IA	Investigating Authority
IRT	Interim Response Team
LDB	Long Duration Balloon
LMPP	Portfolio Project Annex
MM	Mission Manager
MOA	Memorandum Of Agreement
MPCP	Mishap Preparedness Contingency Plan
MRR	Mission Readiness Review
MRSO	Mission Range Safety Officer
NASA	National Aeronautics and Space Administration
NSF	National Science Foundation
NMIS	NASA Mishap Information System
NPR	NASA Procedural Requirement
OSHA	Occupational Safety and Health Administration
OSS	Operations Safety Specialist
pb	piggyback
PI	Principal Investigator
PMC Turbo	Polar Mesospheric Clouds
PPE	Personal Protective Equipment
RAR	Risk Analysis Report
SiPM	Silicon Photomultiplier
SPB	Super Pressure Balloon
SSOPD	Suborbital and Special Projects Directorate
SuperTIGER	Super Trans-lron Galactic Element Recorder
TRAVALB	Trajectory Validation for GUSTO
ULDB	Ultra-Long Duration Balloon
U.S.	United States
WBS	Work Breakdown Structure
WFF	Wallops Flight Facility